E-MAILING FROM 3 MHz-30 MHz

by Gordon West

Sending short packets of E-Mail over the airwaves is commonplace on VHF and UHF frequencies, 30 MHz to 2,500 MHz. Alphanumeric pagers are one form of E-Mail wireless reception. FM broadcast stations may send sub-carrier access (SCA) continuous E-Mail messages to paid subscribers. Home satellite TV receivers are bombarded with audio, video, and text E-Mail messages. The transmission of E-Mail from satellites and terrestrial stations to portable, mobile, and fixed receivers is commonplace.

Transmitting E-Mail messages back is relatively common on VHF, UHF, and microwave frequencies. Delivery trucks and police departments have been doing it for years. Cellular telephone E-Mail connections are commonplace throughout most of the US.

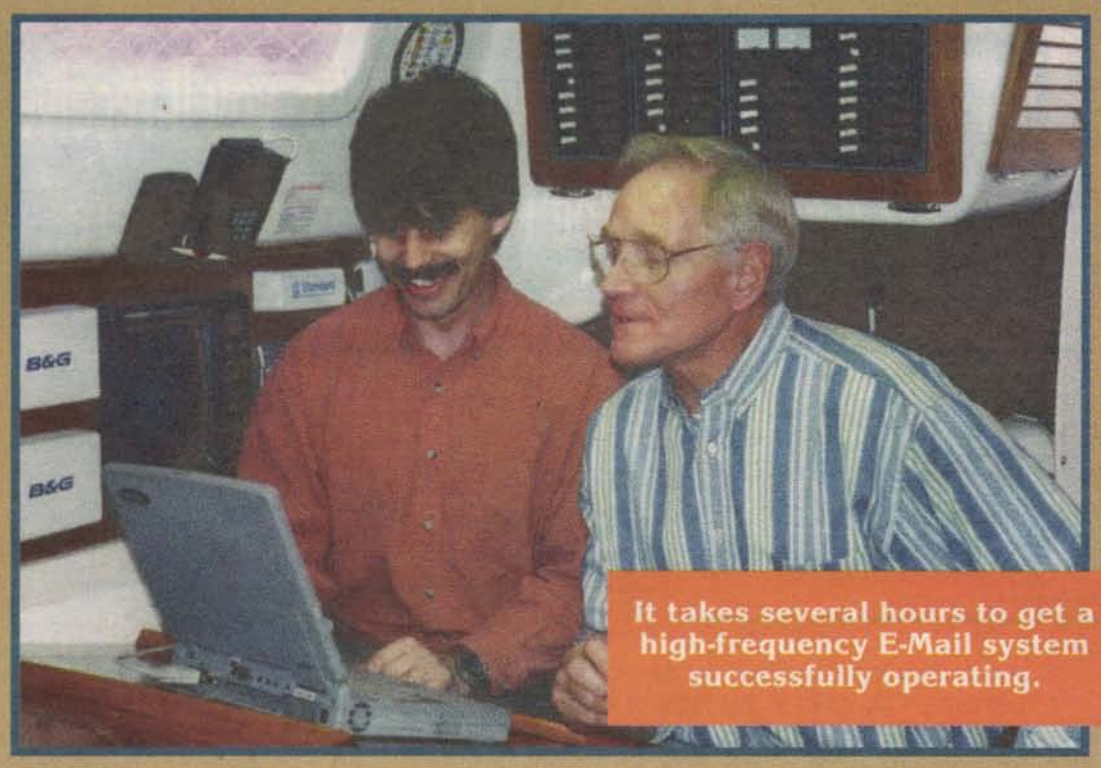
If you're not on a budget, you can return E-Mail communications through a variety of geostationary satellites with spot-beam coverage. It's these spot-beams from the geos that may constantly keep track of E-Mail responses to motor carriers or sailors 100 miles off shore. There are also four total coverage INMARSATs for those mariners that go beyond spot-beam coverage and need to receive and transmit back E-Mail communications. It takes a bigger shipboard antenna to get back to the satellites for worldwide coverage.

And soon we will be blanketed by hundreds of low-earth-orbit satellites providing anywhere E-Mail communications. In another two years, you can take your laptop anywhere in the world and download and upload E-Mail messages just like you do at home plugged into the phone line. Anywhere — but, of course, you'll need to be outside where your computer transmitter/receiver has an unobstructed shot at the sky. Low-earth-orbit E-Mail satellites — such as ORBCOM — work quite nicely to a yard-long telescopic whip that is attached to your wireless computer radio system.

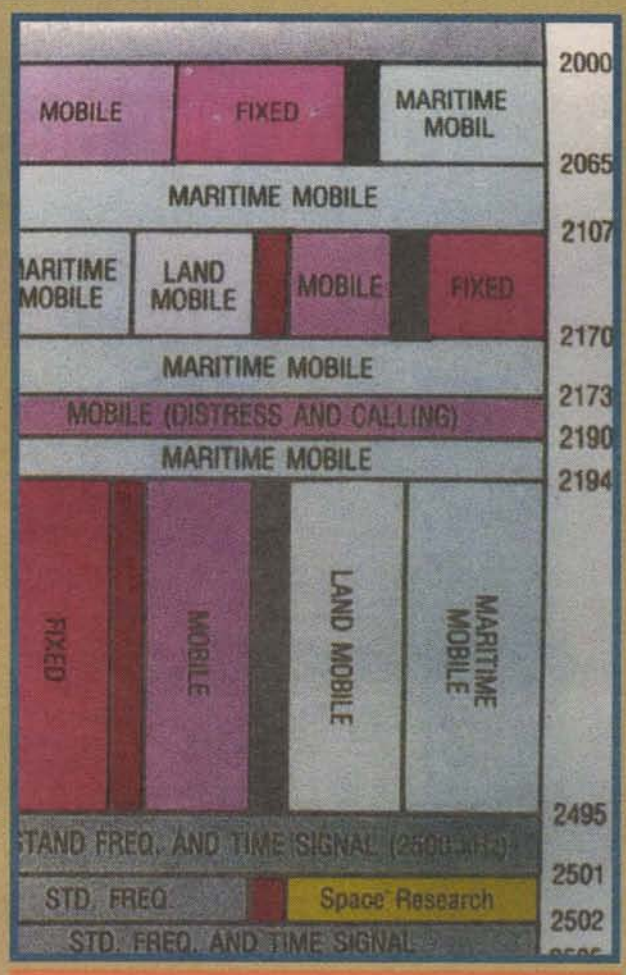
Author West testing the new Magellan ORBCOM data communicator on 137 MHz.

OLD HAT ON HF

Radio frequencies from 3 MHz to 30 MHz have been the stomping grounds for wireless E-Mailers over the past 30 years. Ham radio ops started E-Mail with Model 45 radio teleprinters hooked into their HF worldwide transceivers. Data was bounced off of the ionosphere quite suc-



It takes several hours to get a high-frequency E-Mail system successfully operating.



There are plenty of open frequencies for high-frequency E-Mail connections.

cessfully. Commercial shipping and bigger yachts also had early wireless E-Mail capabilities — called radio telex. They, too, would rely on the F-layer of the ionosphere to refract their data signals back down to a companion station thousands of miles away.

While some hams and boaters have abandoned their long wires and big antenna systems for pay-per-airtime compact satellite stations, their abandonment of the high-frequency bands has opened up a gateway of marine and ham shore-side E-Mail gateway stations, all tuned in and ready to transmit and receive the distant skywave call. And many of these operators can send and receive E-Mail, off of the ionosphere, absolutely free!

But not ALL E-Mail shore stations serving wireless operators all over the world may offer their service for free. Powerful commercial marine coast stations like Globe Wireless in California; Mobile Marine in Mobile, AL; and PinOak in New Jersey indeed charge a monthly fee for their high-frequency E-Mail service, plus possible additional charges if you exceed the amount of allocated characters you are sending or receiving.

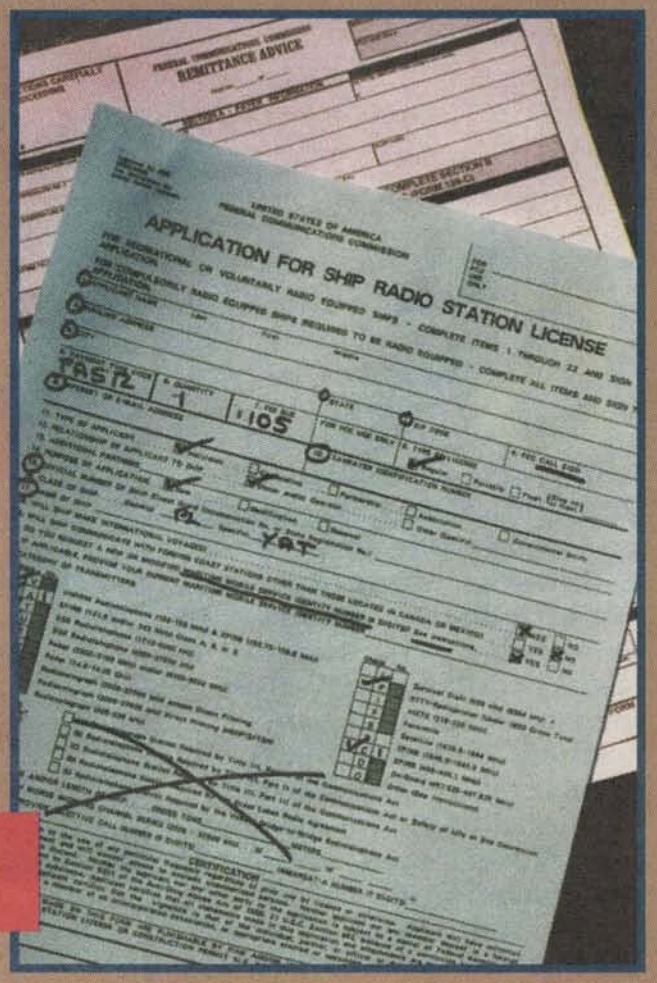
Most commercial E-Mail high-frequency sign-ups run about $40.00 a month which includes plenty of uploads and downloads.

If you regularly do a lot of E-Mail, and if you do it out on the water or in remote areas not served by land lines or cellular phone, commercial E-Mail to these state-side megawatt stations is a pretty good deal. No license test is required, but your equipment must meet specific FCC type-acceptance for Part 80.

ALMOST FREE

If you do your remote or boating thing in just one part of the country, several non-profit "private coast stations" are coming on-line to handle your wireless high-frequency E-Mail. These private coast stations may not have near the coverage or radio system that the commercial boys have, but for under $100.00 a year, they might serve you well with absolutely no additional charges for long-winded keyboarding nor any restriction on what type of messages you are sending over the airwaves.

The group that started this almost-free E-Mail service is called Sail Mail out of Palo Alto, CA. It's like a volunteer organization that specializes in over-the-water messaging. These private coast stations



Boaters must fill out an FCC license application before going on the air with E-Mail on 3 MHz-30 MHz.

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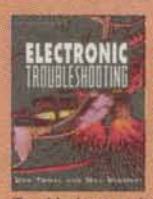

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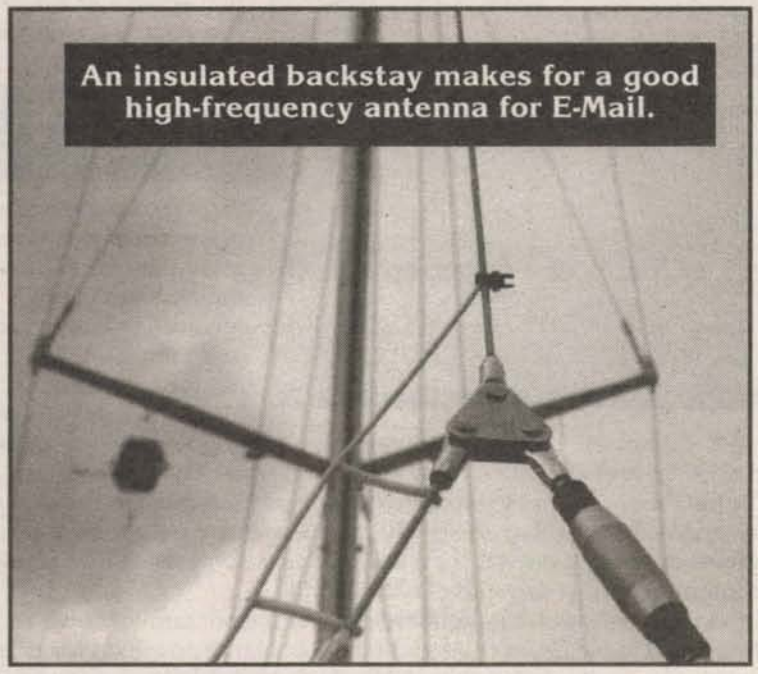
usually reach out for several thousand miles, and data is transferred at a rate between 10 and 60 characters per second.

I know this sounds horribly slow, but keep in mind that there is no air-time charge and your radio and computer are doing all the work after you have composed your mail ahead of time before switching on the transmitter.



An insulated backstay makes for a good high-frequency antenna for E-Mail.

INMARSAT M Geo satellite antenna system on a powerboat.

FREE WITH A LITTLE TEST

Amateur radio operators are the pioneers of the airwaves. Between hams and the military, they STARTED data wireless. The ham radio system is called AIR MAIL, and there are ham-radio-operator run Air Mail sites all over the world.

Each ham station may monitor as few as one, or as many as 17 different frequencies, hoping that other licensed US and foreign hams all over the world will take advantage of their free service. Similar to Sail Mail, the ham E-Mail connection is at a data rate between 10 and 60 characters per second.

Yup, it's like watching paint dry, but the ham would compose the mail rapidly ahead of time, load it into a buffer, hit the send button, and let the radio and computer do the rest.

But the ham system has one important restriction — ABSOLUTELY NO COMMERCIAL BUSINESS ON HAM BANDS. Now that doesn't mean you must only communicate about non-important silly things — it is perfectly okay to E-Mail for parts, reservations, important documents, and things like this that pertain to the ham operator or those around him. But E-Mailing to the office, or conducting business on E-Mail for profit, is not allowed on ham Air Mail.

Also, high-frequency ham band operation requires passing the General class ham license test. And test passing for hams takes a little dedication — 30 days of pounding the books, and then a little bit of Morse Code.

The General class Morse Code test is soon to become a great deal easier — the Federal Communications Commission has proposed dropping the present 13 wpm requirement down to a simple 5 wpm comprehension code test.

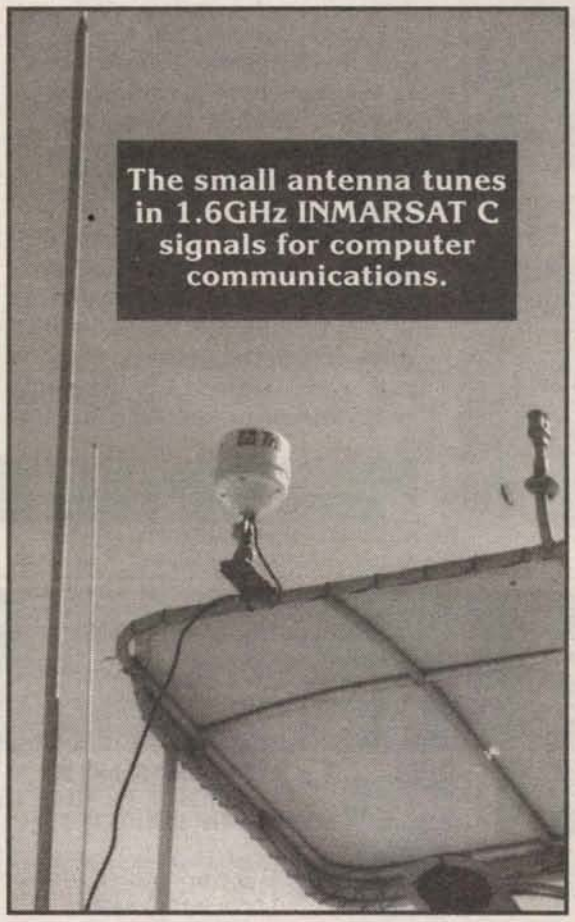
This will remove one of the biggest obstacles to General class high-frequency operation by technical people like *Nuts & Volts* readers who had no problem getting through the theory, but didn't have the time or determination to spend mastering the dots and dashes.

THE EQUIPMENT

For worldwide high-frequency data communications, you will need a high-frequency transceiver that might be a ham set or a Part 80 type-accepted marine SSB.

You will need an antenna system that could be as simple as two pieces of one-quarter wavelength wire strung between two poles and fed to your radio with common coax. You will need your laptop, and you may or may not need a terminal node controller.

A ham out of San Clemente, CA, John Hoot, has perfected a software program along with his patented analog-to-digital plug assembly to run a program that transmits and receives digital modes with absolutely no terminal node controller required (Software Systems Consulting, San Clemente, CA; 949-498-5784).



The small antenna tunes in 1.6GHz INMARSAT C signals for computer communications.

John and his wife continue to amaze the data industry by coming up with smarter and smarter software that may take the job of the hard-working terminal node controller. But I must say, when conditions get rough, terminal node controllers like Kantronics can really pull signals out of the noise. And the most amazing TNCs come from Hal and SCS that can extract data signals from what sounds like nothing but hash coming out of the speaker!

Some of the best software to support these radio data modes is written by Jim Corenman, an avid yachtsman. It is freeware and available on the Internet.

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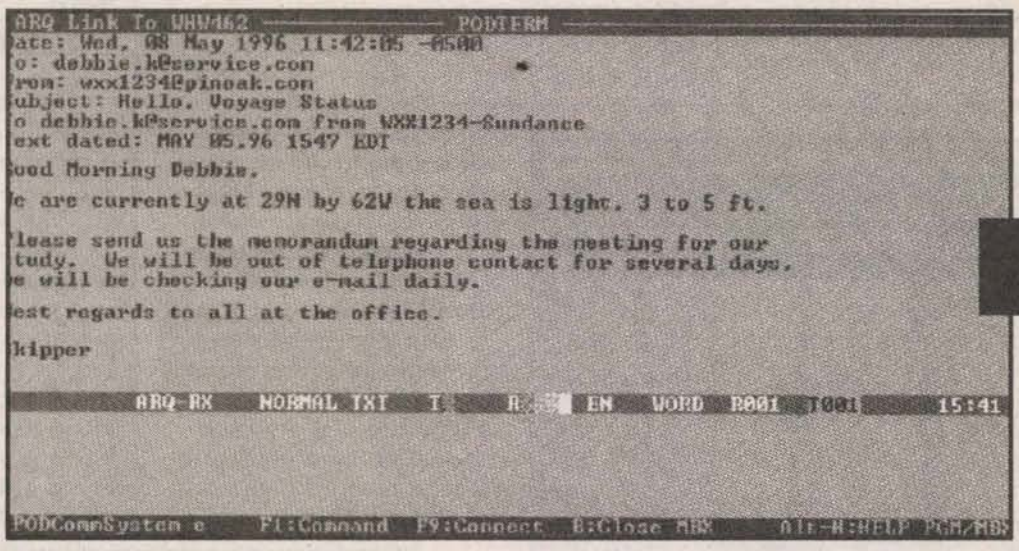
ARQ Link To WHW462 — PODTERM
Date: Wed, 08 May 1996 11:42:05 -0500
To: debbie.k@service.com
From: wxx1234@pineak.com
Subject: Hello, Voyage Status
To debbie.k@service.com from WXX1234-Sundance
Text dated: MAY 05.96 1547 EDT
Good Morning Debbie.
We are currently at 29N by 62W the sea is light, 3 to 5 ft.
Please send us the memorandum regarding the meeting for our study. We will be out of telephone contact for several days. We will be checking our e-mail daily.
Best regards to all at the office.
Skipper
ARQ-RX NORMAL TXT I R:96 EN WORD R001 T001 15:41
PODComSystem e F1:Command F9:Connect F8:Close ARQ Alt-H:HELP PGH/ARQ

Typical E-Mail message.

Look at www.sailmail.com/mprimer.htm. Pay attention to the section on performance and PROBLEMS. "Coming up on high-frequency radio and sending successful E-Mail is not a plug-and-play operation," comments Julian Frost N3JF, an HF E-Mail installer and problem-solver (Costa Mesa, CA; 949-646-6567).

"Any computer located within a few feet of the radiating antenna may get saturated from the strong radio frequency near-field and distort the outgoing datastream," adds Frost.

This leads to a no-connect at the other station ecause all it hears is a distorted transmit signal.

"Your same computer can also generate severe interference to the high-frequency receiver, masking weak incoming E-Mail responses," advises Frost. "Sometimes the older and slower 486 laptop computers running Windows 95 are better suited to HF E-Mail operation than the newer, faster Pentium 233 system," adds Frost. But once you get your E-Mail high-frequency radio system up and running with a successful exchange to a distant base station, chances are you are set for a low-cost and sometimes free gateway to the Internet, almost anywhere in the world.

The ionosphere won't be affected by any millennium hiccups, so high-frequency E-Mail is now becoming a popular proposition for those radio operators wanting the ultimate back-up to satellites and land-line E-Mail servers.

Ultimately, satellite E-Mail handheld transponders may become the most popular way of staying in touch, but there will still be high-frequency E-Mail communications by those who want to save money and enjoy the art of bouncing signals off of the ionosphere. **NV**

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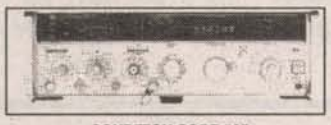

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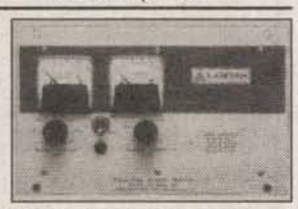

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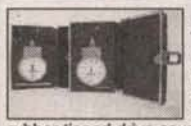

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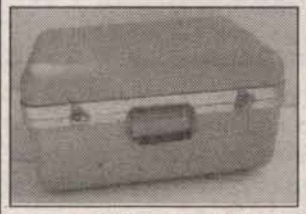

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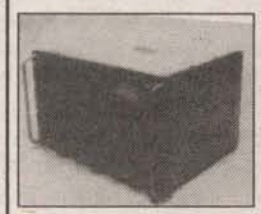

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